Light, 24; Fort Canby, 25; Astoria and Portland, Oreg., 27; Key West, 28; Tatoosh Island, 29.

The *accumulated monthly departures* from normal temperatures from January 1 to the end of the current month are given in the second column of the following table, and the average departures are given in the third column, for comparison with the departures of current conditions of vegetation from the normal conditions.

Districts.	Accumulated departures.		Districts.	Accumulated departures.	
	Total.	Average.		Total.	Average.
	°	°		°	°
New England	+ 4.6	+ 0.4	Middle Atlantic	— 7.3	— 0.6
Upper Lake	+ 0.2	0.0	South Atlantic	—17.7	— 1.5
North Dakota	+ 3.7	+ 0.3	Florida Peninsula	—16.6	— 1.4
Missouri Valley	+ 2.4	+ 0.2	East Gulf	—20.6	— 1.7
Northern Plateau	+ 0.8	+ 0.1	West Gulf	—20.6	— 1.7
			Ohio Valley and Tenn.	—13.1	— 1.1
			Lower Lake	— 6.9	— 0.6
			Upper Mississippi	— 1.9	— 0.2
			Northern Slope	—11.9	— 1.0
			Middle Slope	— 6.3	— 0.5
			Abilene (southern Slope)	—23.1	— 1.9
			Southern Plateau	—12.4	— 1.0
			Middle Plateau	—17.1	— 1.4
			North Pacific	— 4.0	— 0.3
			Middle Pacific	— 9.5	— 1.8
			South Pacific	—10.0	— 0.8

The limit of freezing weather is shown on Chart VI by the isotherm of minimum 32, and the limit of frost by the isotherm of minimum 40.

MOISTURE.

The *quantity of moisture* in the atmosphere at any time may be expressed by the weight contained in a cubic foot of air, or by the tension or pressure of the vapor, or by the temperature of the dew-point. The mean dew-points for each station of the Weather Bureau, as deduced from observations made at 8 a. m. and 8 p. m., daily, are given in Table I.

The *rate of evaporation* from a special surface of water on muslin at any moment determines the temperature of the wet-bulb thermometer, but a properly constructed evaporometer may be made to give the *quantity* of water evaporated from a similar surface during any interval of time. Such an evaporometer, therefore, would sum up or integrate the effect of those influences that determine the temperature as given by the wet bulb; from this quantity the *average humidity of the air* during any given interval of time may be deduced.

Sensible temperatures.—The sensation of temperature experienced by the human body and ordinarily attributed to the condition of the atmosphere depends not merely on the temperature of the air, but also on its dryness, on the velocity of the wind, and on the suddenness of atmospheric changes, all combined with the physiological condition of the observer. The condition of the atmosphere as to moisture is so important that it has, by exaggeration, been sometimes considered as a controlling feature and the temperature of the wet-bulb thermometer, when whirled in the shade, has been called the sensible temperature, although this is often but a partial index of the sensation of temperature. In order to present a monthly summary of the atmospheric conditions on which hygienic and physiological phenomena depend, the moisture must be fully considered, and therefore Table VIII has been prepared, showing the maximum, minimum, and mean readings of the wet-bulb thermometer at 8 a. m. and 8 p. m., seventy-fifth meridian time. A complete expression for the relation between atmospheric conditions and nervous sensations is under consideration, but has not yet been obtained.

PRECIPITATION.

[In inches and hundredths.]

The *distribution of precipitation* for the current month, as determined by reports from about 2,500 stations, is exhibited on Chart III. The numerical details are given in Tables I, II, and III. The total precipitation for the current month was heaviest, 20.00 to 25.00, on the immediate coasts of Oregon and Washington. A region of heavy precipitation, 10.00 to 12.00, extends from central Oklahoma, northeast to central Missouri. This latter feature in the distribution of rain and snow is due to the fact that the heaviest precipitation in this region occurred in belts extending northeast and southwest between a system of warm southeast winds and cold north winds on December 18th, 19th, and 20th.

The *diurnal variation* is shown by Table XII, which gives the total precipitation for each hour of seventy-fifth meridian time, as deduced from self-registering gauges kept at about 43 regular stations of the Weather Bureau; of these 37 are float gauges and 6 are weighing gauges.

The *normal precipitation* for each month is shown in the Atlas of Bulletin C, entitled "Rainfall and Snow of the United States, compiled to the end of 1891, with annual, seasonal, monthly, and other charts."

The *current departures* from the normal precipitation are given in Table I, which shows that there was an excess in northern Texas and thence northeastward over the Lake Region, also in western Oregon and Washington. There was a deficiency throughout the Atlantic and Gulf coasts, California and the Rocky Mountain Plateau.

Large excesses were: Neah Bay, 9.4; Tatoosh Island, 8.7; Springfield, Mo., 8.6; Astoria, 6.5; Columbia, Mo., 6.8; Springfield, Ill., 5.6; Chicago, 4. 4; Jupiter, 4.3. The large deficits were: San Francisco, 3.8; Los Angeles, 3.7; Point Reyes Light, 3. 6; Shreveport, 3.1.

The *average departure* for each district is also given in Table I. By dividing these by the respective normals the following corresponding percentages are obtained (precipitation is in excess when the percentages of the normals exceed 100):

Above the normal: Florida Peninsula, 128; Ohio Valley and Tennessee, 111; lower Lake, 155; upper Lake, 144; upper Mississippi, 149; Missouri, Valley, 281; Abilene, (southern Slope), 211; north Pacific, 146.

Normal: Middle Slope, 100.

Below the normal: New England, 86; Middle Atlantic, 91; South Atlantic, 66; east Gulf, 85; west Gulf, 83; North Dakota, 60; northern Slope, 65; southern Plateau, 56; middle Plateau, 57; northern Plateau, 86; middle Pacific, 55; southern Pacific 22.

The *total accumulated monthly departures* from normal precipitation, from January 1 to the end of the current month, are given in the second column of the following table; the third column gives the ratio of the current accumulated precipitation to its normal value.

Districts.	Accumulated departures.	Accumulated precipitation.	Districts.	Accumulated departures.	Accumulated precipitation.
	Inches.	*Per ct.*		*Inches.*	*Per ct.*
Florida Peninsula	+ 0.70	101	New England	— 5.30	88
Abilene (southern Slope)	+ 7.20	126	Middle Atlantic	— 9.10	80
Southern Plateau	+ 0.40	104	South Atlantic	— 6.30	51
			East Gulf	— 8.60	85
			West Gulf	— 6.70	87
			Ohio Valley and Tenn.	—11.00	76
			Lower Lakes	— 5.80	83
			Upper Lakes	— 7.00	79
			North Dakota	— 1.10	94
			Upper Mississippi	— 7.80	78
			Missouri Valley	— 2.90	91
			Northern Slope	— 0.40	97
			Middle Slope	— 1.60	98
			Middle Plateau	— 2.60	80
			Northern Plateau	— 4.50	73
			North Pacific	— 4.10	93
			Middle Pacific	— 5.60	81
			South Pacific	— 5.40	68

The years of greatest and least precipitation for December are

given in the REVIEW for December, 1894. The precipitation for the current month was the greatest on record at: Jupiter, 6.27; Lexington, 5.50; Chicago, 6.76; Springfield, Ill., 8.08; Springfield, Mo., 11.02; Kansas City, 5.12; Miles City, 0.77; Astoria, 17.54. It was the least on record at: Minneapolis, 0.15; Sioux City, 0.02; Pierre, 0.01; Lander, trace.

Details as to *excessive precipitation* are given in Tables XIII and XIV.

The *total monthly snowfall* at each station is given in Table II. Its geographical distribution is shown on Chart No. VI. The southern limit of freezing temperatures and possible snow is shown on this chart by the isotherm of minimum 32°. The isotherm of minimum 40°, namely, the air temperature within the thermometer shelter, is also given on this chart, and shows approximately the southern limit of frost on exposed surfaces.

The depth of snow on the ground at the close of the month is shown on Chart VII.

HAIL.

The following are the dates on which hail fell in the respective States:

Arizona, 17. Arkansas, 20. California, 15, 16, 17. Delaware, 31. Georgia, 29. Illinois, 17. Kansas, 16. Nebraska, 16. South Carolina, 26. Texas, 18, 29. Washington, 12, 20, 21, 23, 27.

SLEET.

The following are the dates on which sleet fell in the respective States:

Alabama, 4, 12, 28, 30. Arkansas, 11, 20, 29, 30. California, 15, 19, 20. Georgia, 10. Idaho, 6, 25, 27. Illinois, 1, 10, 11, 19, 20, 22, 24. Indiana, 2, 11, 16, 21. Iowa, 1, 17 to 20, 24, 25, 28. Kansas, 1, 2, 17, 18, 19, 22, 24. Kentucky, 3, 8, 20, 25, 30. Louisiana, 20, 27, 29, 30. Maryland, 8, 21, 26, 28, 30. Michigan, 1, 12, 16, 17, 19, 23. Minnesota, 10, 16, 17, 21, 28. Mississippi, 20, 27, 29, 30. Missouri, 1, 11, 12, 17 to 20, 24, 25, 29. Montana, 14, 27. Nebraska, 20, 22, 23. Nevada, 17 to 20. New Hampshire, 22. New Jersey, 8. New York, 2, 6, 15, 17, 26, 27, 30, 31. North Carolina, 9, 10, 28, 30, 31. North Dakota, 9, 17, 28. Ohio, 2, 8, 12, 21, 25, 26, 27, 30, 31. Oklahoma, 2, 17, 19, 23. Oregon, 5, 12 to 16, 18 to 24, 27, 28, 29, 31. Pennsylvania, 2, 26, 30, 31. South Carolina, 4, 10, 27, 28, 31. Tennessee, 2, 28, 29, 30. Texas, 23, 25, 29. Utah, 13. Vermont, 26. Virginia, 9, 26, 30. Washington, 2, 5, 13, 15, 18, 19, 20, 22, 23, 26, 27, 29, 31. West Virginia, 26, 30, 31. Wisconsin, 11, 17, 19, 20, 25, 28.

WIND.

The *prevailing winds* for December, 1895, viz, those that were recorded most frequently, are shown in Table I for the regular Weather Bureau stations.

The *resultant winds*, as deduced from the personal observations made at 8 a. m. and 8 p. m., are given in Table IX. These latter resultants are also shown graphically on Chart II, where the small figure attached to each arrow shows the number of hours that this resultant prevailed, on the assumption that each of the morning and evening observations represents one hour's duration of a uniform wind of average velocity. These figures indicate the relative extent to which winds from different directions counterbalanced each other.

HIGH WINDS.

Maximum wind velocities of 50 miles or more per hour were reported at regular stations of the Weather Bureau as follows (maximum velocities are averages for five minutes; extreme velocities are gusts of shorter duration, and are not given in this table):

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
		Miles				*Miles*	
Block Island, R. I	11	68	ne.	Kittyhawk, N. C.	10	60	n.
Do	13	56	ne.	Do	13	66	n.
Do	14	60	ne.	Lexington, Ky	26	60	sw.
Do	27	55	sw.	Nantucket, Mass	11	51	e.
Do	31	57	sw.	New Haven, Conn	27	55	s.
Boston, Mass	31	50	s.	New York, N. Y	26	70	s.
Buffalo, N. Y	7	50	w.	Do	27	73	w.
Do	22	50	sw.	Do	30	50	se.
Do	31	78	w.	Do	31	72	w.
Cheyenne, Wyo	27	50	w.	Oswego, N. Y	31	50	w.
Chicago, Ill	11	54	ne.	Philadelphia, Pa	26	50	sw.
Denver, Colo	30	60	nw.	Portland, Oreg	31	53	se.
Eastport, Me	5	54	ne.	Pueblo, Colo	30	51	w.
Do	6	50	n.	Rochester, N. Y	31	52	sw.
Do	27	54	se.	Tatoosh Island, Wash	3	52	ne.
Do	31	54	se.	Do	11	50	s.
Fort Canby, Wash	2	52	e.	Do	14	52	sw.
Do	9	66	s.	Do	19	60	sw.
Do	11	60	s.	Do	22	60	s.
Do	14	55	s.	Do	23	69	w.
Do	19	60	s.	Do	25	52	w.
Do	22	60	s.	Do	26	56	s.
Do	23	70	s.	Do	27	52	w.
Do	25	50	s.	Do	31	58	s.
Do	26	56	s.	Williston, N. Dak	27	54	w.
Do	29	60	s.	Do	28	50	nw.
Do	31	72	s.	Do	29	52	nw.
Hatteras, N. C	10	60	n.	Winnemucca, Nev	15	54	sw.
Do	11	52	n.	Do	20	56	sw.
Do	13	56	n.	Do	28	58	nw.
Do	31	56	nw.	Woods Hole, Mass	6	52	nw.
Huron, S. Dak	15	52	se.	Do	27	54	se
Independence, Cal	28	53	n.	Do	31	66	sw.

SUNSHINE AND CLOUDINESS.

The quantity of sunshine, and therefore of heat, received by the atmosphere as a whole is very nearly constant from year to year, but the proportion received by the surface of the earth depends upon the absorption by the atmosphere, and varies largely with the distribution of cloudiness. The sunshine is now recorded automatically at 16 regular stations of the Weather Bureau by its photographic, and at 21 by its thermal effects. At one station records are kept by both methods. The photographic record sheets show the apparent solar time, but the thermometric sheets show seventy-fifth meridian time; for convenience the results are all given in Table XI for each hour of local mean time.

Photographic and thermometric registers give the duration of that intensity of sunshine which suffices to make a record, and, therefore, they generally fail to record for a short time after sunrise and before sunset, because, even in a cloudless sky, the solar rays are then too feeble to affect the self-registers. If, therefore, such records are to be used for determining the amount of cloudiness, they must be supplemented by special observations of the sky near the sun at these times. The duration of clear sky thus specially determined constitutes the so-called twilight correction (more properly a low-sun correction), and when this has been applied, as has been done in preparing Table XI, there results a complete record of clear sky from sunrise to sunset in the neighborhood of the sun. The twilight correction is not needed when the self-registers are used for ascertaining the duration of a special intensity of sunshine, but is necessary when the duration of cloudiness is alone desired, as is usually the case.

The cloudiness is determined by numerous personal observations at all stations during the daytime, and is given in the column of "average cloudiness" in Table I; its complement, or percentage of clear sky, is given in the last column of Table XI.

COMPARISON OF DURATIONS AND AREAS.

The sunshine registers give the *duration* of direct sunshine whence the percentage of duration of possible sunshine is derived; the observer's personal estimates give the percentage of *area* of clear sky. These numbers have been brought